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## Prospects for in-situ Rb-Sr mica geochronology in metamorphic petrology

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The emerging field of “in-situ beta decay dating” has enormous potential for Earth Sciences. Here, the Rb-Sr system is the most advanced, although other systems (e.g., K-Ca, Lu-Hf, Re-Os) promise exciting opportunities as well. In this contribution, I want to first highlight several analytical and conceptual advances made with regard to in-situ Rb-Sr geochronology, and in particular utilizing the mica group (mostly biotite, muscovite and glauconite): (1) the community (e.g., Redaa et al, 2022) has made important progress characterizing the reference material Mica-Mg (from CRPG) for Rb-Sr ratios and Sr isotope composition, used as a nanopowder pellet, it currently serves in most laboratories as a primary reference material; (2) several new natural mica samples have been distributed to several laboratories to serve as secondary reference materials (Rösel & Zack, 2022). Both these activities serve not only to improve precision and accuracy of this technique, but in general allows better comparison of results of different studies. Furthermore, (3) many micas are almost devoid of Sr when forming, which allows treating them similar to zircon in the U-Pb system, meaning that the common Sr can simply be estimated, making the isochron approach obsolete (Rösel & Zack, 2022). This has important practical implication; so-called single spot ages can be utilized to map out age distribution within single crystals, target crystals of different textural context or even used in provenance studies of detrital mica (Rösel et al., this conference). Finally, (4) as most analytical facilities where in-situ beta decay dating is possible employ a quadrupole ICP-MS, selecting isotopes for spot analysis are not limited to Rb and Sr isotopes, but can set to cover all elements of interest from Li to U. With sufficient care in the choice of calibration material, it is possible to not only couple age information with trace element signatures, but even calculate mica mineral formula with surprising accuracy. In my presentation I want to illustrate how in-situ Rb-Sr mica geochronology can be utilized in the field of metamorphic petrology. For further applications in metamorphic settings, please also see Barnes et al. (this session).